
SPECIFICATION SHEET

SUPPLY, INSTALLATION AND COMMISSIONING OF A “CRYO-FREE LOW-VIBRATION CRYOSTAT” FOR THE LABORATORY OF THE INSTITUT DE CIÈNCIES PHOTONIQUES, THROUGH AN OPEN PROCEDURE SUBJECT TO HARMONIZED REGULATION

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CLAUSE 1. Object of the contract

The purpose of this contract is the supply, installation and commissioning of a “CRYO-FREE LOW-VIBRATION CRYOSTAT” for ICFO’s laboratory.

The types of items supplied are linked to the CPV (Common Public Procurement Vocabulary), **38000000-5** Laboratory, optical and precision equipment (except glasses).

CLAUSE 2. Needs to satisfy

We are building a low-temperature optical quantum twisting microscope (QTOM). In such a microscope, there is a tip and a sample, both covered with two-dimensional materials. They are brought into contact and a tunnelling current between them is recorded. Additionally, the sample stage is continuously rotated and, as a result, a current map that is equivalent to the convolution of the electronic structures of tip and sample is obtained. This new type of scanning microscope can be applied to layered quantum materials such as metals, semiconductors, superconductors, topological insulators, Weyl semimetals and magnets. Due to the nature of the physics that will be studied, the QTOM needs to work at low-temperatures. Moreover, extremely low vibrations are necessary to record the current signal as a function of the rotational angle. At ICFO, there is no QTOM equipment.

We are looking to purchase a closed-cycle and low-vibration cryostat platform with a magnet and a top loading system with automated temperature and magnetic field control, variable temperature and top-table for an optical system. The system should include:

1. Ultra-low vibration closed-cycle cryostat
2. 9 T magnet
3. Electronics cabinet
4. Measurement insert

CLAUSE 3. Technical requirements

The system should guarantee:

- <150 pm of mechanical noise in the out-of-plane direction (at a bandwidth of 195 Hz). Vibration measurements with a cantilever-based AFM at low temperature are required demonstrating that the vibration specifications are met at the company laboratory
- Cooldown time of insert of <10 hours
- Base temperature <2 K
- Maximum magnetic field of 9 T
- Power consumption max. 9.0 kW (steady state: 7.2 kW)

The system should include:

- Automated gas handling system for continuous operation at base temperature
- Integrated touchscreen (4.3") for convenient and easy control of temperature and magnetic field
- Compressor and helium flex lines (40 ft)
- Vibration isolated sample tube 2" (OD)
- Length of flexlines/cabling between compressor and cryostat: 12 m (40 ft)

Cryostat Dimensions:

- The cryostat setup should be put in lab with a ceiling height of 2.7m

CLAUSE 4. Power distributions and safety

- The system should be configured for EU (Spain) power grid (voltage, sockets, etc.) and be CE marked.
- The system will be fully protected against unexpected power cuts and, in that case, will be fully safe for the operators. A quick and easy turning on of the system has to be possible after a power cut.

CLAUSE 5. System layout and services

- The proposal will include a complete set of pictures, drawings and layouts of the system, including dimensions, location and details of the different components.
- The proposal **will include full installation and start-up requirements (Unpack all system components; Assembly; Pump; Run system to base temperature; Demonstrate temperature control; Run magnet; During the installation process, instruction should be provided on proper procedures for operation and maintenance of the system)**, clearly specifying connection type, tubing materials, pressures, flows, etc, for the specific configuration of the offered system.
- 1 copy of the Operating and maintenance manuals must be delivered in English.

CLAUSE 6. Transportation, installation, start-up and training

- The proposal will include transportation to ICFO's facilities including insurance and all export/import and customs duties. **DAP incoterm will apply.**
- The machine will be placed in the selected location by ICFO. Contract winner will cover all costs, organization and coordination of machine placement, including any required specialized equipment or vehicle, and any required component disassembly and reassembly for system unloading and transportation inside the building to the target lab location.

CLAUSE 7. Warranty and Follow-on Support

- **1-year Full Warranty** on all parts and components of the system irrespective of the manufacturer. The warranty will include the replacement of any faulty or damaged part(s) during normal use of the system, no matter the manufacturer of the component(s). It will cover any cost related with the disassembly, transportation, reparation and re-assembly of the damaged component(s), including all travelling and living costs of the required service engineer(s). An on-site repair, or a justified alternative to reduce the system down time to the minimum, will always be the first service option. A team of properly qualified and skilled service engineers will have to be available.

CLAUSE 8. Training

- Training of ICFO personnel in correct operating and maintenance procedures during the installation process must be included.

CLAUSE 9. Delivery and Installation Time

The system must be delivered and installed at ICFO within a maximum period of **18 months.**

Delivery time is defined as the time elapsed since the PO until the system delivery at ICFO facilities. It includes the manufacture of the system, the transportation, the installation and the acceptance test at ICFO's premises.

CLAUSE 9. Target price

- The target price for the system is 500.000,00 € (VAT excluded).
- Payment terms:
 - Payment upon order - 50% total price
 - Payment upon delivery - 40% total price
 - Payment upon installation - 10% total price

Castelldefels, 22 December 2023



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GL STM on 2D quantum materials